week corresponding to any date. In October last he described in NATURE a brief method of dividing a given number by 9 or 11; and a second paper on the same subject, which appears in our correspondence columns this week, probably represents his latest contribution to mathematics.

A characteristic of all his work was the absolute exactness of expression at which he aimed, so that his definitions and proofs should be logically perfect. This carried a certain severity into his work, since, as he has himself remarked, a semi-colloquial style is apt to be also semi-logical, as nothing is more easy than to forget, in an argument which is interwoven with illustrative matter, what has, and what has not, been proved. It further tended to require the repetition of what might for exactness have to be a somewhat cumbrous periphrasis, to prevent which, therefore, he introduced a number of new terms and symbols; few of these have, however, been adopted into general use, though of the latter some are extremely expressive, and in his hands were of great value.

Mr. Dodgson's mind was essentially logical, in spite of the whimsical humour which has endeared "Lewis Carroll" to every boy and girl—nay, every adult—in the kingdom; and of late years he devoted a large part of his time to the study of the syllogistic methods of formal logic. In 1887 he published "The Game of Logic," and in 1896 "Symbolic Logic, Part I."

A shy and retiring man, he was to his friends a most charming companion, overflowing with the quaintest of humour, and one whose love for children was typical of himself, and whom to know was to love.

## *NOTES.*

MATHEMATICIANS of all countries will be glad to hear that active steps are being taken to perpetuate the memory of the late Prof. J. J. Sylvester in a manner worthy of his reputation and in consonance with the spirit of his work. The movement was originated in this country by a few friends and admirers of the late Professor's, who decided upon founding a Sylvester Medal for the encouragement of mathematical research. The sympathy with the movement displayed by all the mathematicians who were communicated with, led the initiators to the conclusion that the most appropriate memorial would be one of international foundation, the more especially as Sylvester had a large number of friends and pupils in America, where indeed he may be said to have brought about a mathematical awakening through his connection with the Johns Hopkins University. The list of the International Committee which has now been issued, although only a preliminary one, comprises nearly the whole of the leading mathematicians of the world, besides many of the personal friends of the deceased mathematician and the representatives of the Universities of Oxford, Cambridge, London, Glasgow, Edinburgh and Dublin. From this list it might appear invidious to select names, but it is satisfactory to be able to call attention to the fact that it includes the Chancellor, High Steward and Counsel of the University of Cambridge, the Vice-Chancellor of the University of Oxford, the Provost of Trinity College, Dublin, the President of University College, London; with Lord Kelvin and Prof. P. G. Tait as representatives of the Universities of Glasgow and Edinburgh, and Prof. Henrici of the City and Guilds Institute. France is represented by Profs. Hermite, Poincaré, Camille Jordan, and Darboux; Germany by Profs. Schwarz, Klein, Fuchs, Gordan, and Lindemann; Italy by the late Prof. Brioschi, and by Prof. Cremona; and Sweden by Prof. Mittag-Leffler. America has no less than fifteen names on the list, among them being President Gilman of the Johns Hopkins, Profs. Simon Newcomb, Willard Gibbs, and others representing the mathematical chairs of the various Universities. It is indeed certain that some movement of the kind would have been initiated in America if Sylvester's admirers in this country had not taken action. Now through Dr. Cyrus Adler, of the Smithsonian Institution, and Dr. G. Bruce Halsted, of Texas (a former pupil of Sylvester's), the Americans are working for the general scheme, and the two gentlemen named are acting as Treasurers for the United States. The general Treasurer of the fund is Lord Rothschild; Major P. A. MacMahon is acting as Hon Secretary, and Prof. Meldola, as a friend of the late Prof. Sylvester's, undertook the arduous work of preliminary organisation with the results which we are now making public. The executive Committee consists of Lord Rothschild, Major MacMahon, Prof. Forsyth, Prof. Greenhill, Prof. Henrici, and Prof. Meldola as Organising Secretary. We are informed that the subscriptions from private sources reached over 500*l*. at the end of the year, and now exceed 600*l*., the American contributions not having yet been forwarded. It is proposed that the Medal shall be awarded triennially through the Council of the Royal Society, irrespective of nationality. Any friends of Sylvester's, or others who desire to participate in the movement, may send contributions to Lord Rothschild, New Court, St. Swithin's Lane, E.C.

MRS. TYNDALL, the widow of Prof. Tyndall, has sent the following letter to Sir James Crichton-Browne, F.R.S., the Treasurer of the Royal Institution: "Dear Sir James,—As an expression of his attachment to the Institution, with which he was so long connected, and of his sympathy with its objects, my dear husband desired me (at such time as should be most convenient to myself) to present in his name to the Royal Institution 1000*l*. to be disposed of as the Board of Managers may see fit for the promotion of science. I have now the pleasure of remitting to you this sum. Yours faithfully, LOUISA C. TYNDALL." Sir James Crichton-Browne, in the course of his letter acknowledging this generous donation, remarks:—"The managers would, I am sure, desire to be guided by any wish of yours as to the application of the gift; but, in the absence of any explicit directions, they will, I have no doubt, employ it in the promotion of that original scientific research in which your husband's vivid and penetrating intellect delighted to exercise itself. Revered as your late husband's memory is, and ever must be, in the Royal Institution, this posthumous mark of his solicitude for its welfare will, if possible, deepen the affectionate esteem in which he is held."

THE Council of the Royal Astronomical Society have awarded the Gold Medal of the Society for this year to Mr. W. F. Denning, "for his meteoric observations, his cometary discoveries, and other astronomical work." The award was confirmed on Friday last, and the medal will be given at the annual general meeting next month.

THE deaths are announced of Dr. Eduard Lindemann, scientific secretary in the observatory of Pulkova; and Dr. Oscar Stumpe, well known for his contributions on the motion of the solar system.

DR. MAQUENNE, assistant at the Paris Muséum d'histoire naturelle, has been nominated professor of plant physiology, in succession to the late M. Georges Ville.

AT the February meeting of the Edinburgh Mathematical Society, a discussion on the proposal that, in the teaching of elementary geometry, Euclid's definition of proportion be abandoned, will be introduced by Prof. Gibson.

WE regret to see the announcement of the death of Lieut. Colonel C. Cooper-King, lecturer in natural science at the Staff College, Camberley. Colonel Cooper-King was a Royal Marine Artillery officer, and before joining the Staff College was an instructor at the Royal Military College, Sandhurst.

A LETTER which appears in our correspondence columns, on poisoning from Koda millet, which is extensively used as a food-grain in times of scarcity, furnishes another instance of the urgent need that exists for further facilities for scientific investigation in India. Matters are continually arising which ought to be made the subjects of systematic inquiry, but at present the means for carrying out such investigations are altogether inadequate to the wants of our great Indian Empire.

WE learn from *Science* that ground was formally broken for the Museum Building of the New York Botanical Garden on December 31. The construction and equipment of the building will cost 347,019 dollars. The plans for the great range of horticultural houses have been completed, and specifications for them have been printed. The sum of 15,000 dollars, in addition to the funds provided by the Act of Incorporation, has been made available for the building of portions of the drive-way system. During the past season about 2900 species of plants have been obtained, together with large quantities of museum, library, and herbarium material.

THE Royal Photographic Society is organising an international exhibition of photographic apparatus and photographs, which will open at the Crystal Palace on April 27. In addition to the usual displays of pictures, &c., the leading firms, manufacturers and dealers, will be largely represented. There will also be extensive loan collections, illustrating not only the history of photography, but its scientific and commercial applications, photo-mechanical processes, photographs in colours, photographs by means of the X-rays, and kindred exhibits. The exhibition, the arrangements for which are in the hands of a joint committee of members of the Society and exhibitors, promises to be the largest and most interesting collection dealing with photography that has ever been got together.

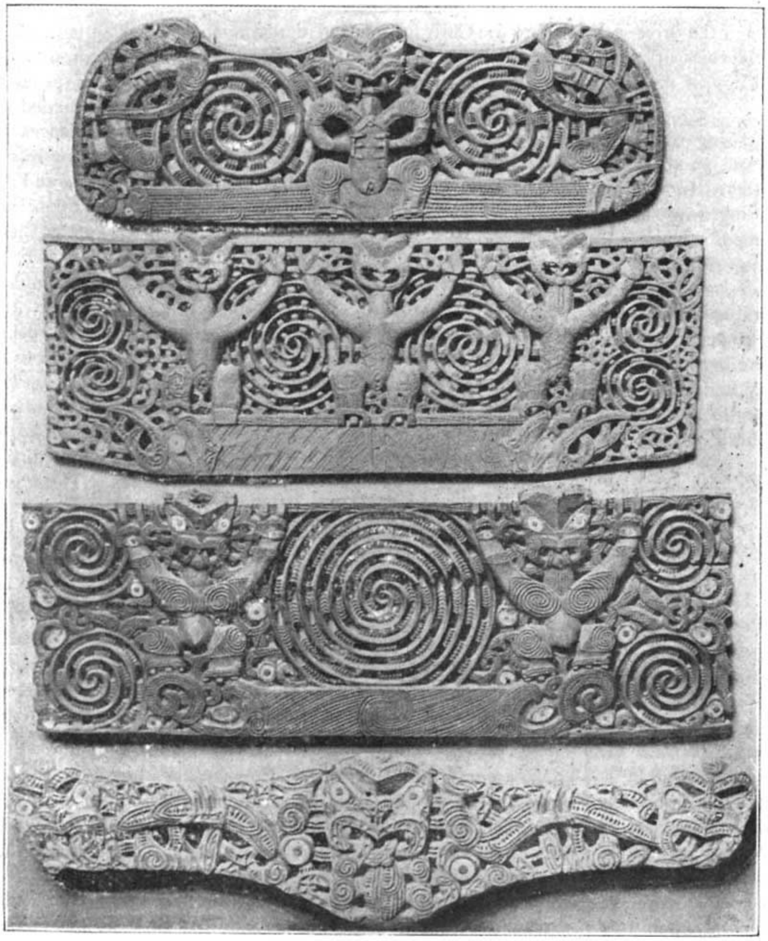
THE sixteenth annual meeting of the American Society of Naturalists and Affiliated Societies was held at Cornell University at the end of last year. In the absence of the president, Prof. Whitman, of the University of Chicago, the chair was taken at the opening meeting by Prof. S. F. Clarke. The officers elected for the ensuing year are:—President: H. P. Bowditch, Harvard Medical School. Vice-Presidents: Prof. Wm. James, Harvard University; Prof. Simeon H. Gage, Cornell University; Prof. H. S. Williams, Yale University. Secretary: Prof. H. C. Bumpus, Brown University. Treasurer: Prof. John B. Smith, Rutgers College. Executive Committee: Prof. J. P. McMurrich, University of Michigan; Prof. E. G. Conklin, University of Pennsylvania. At the instance of Prof. Morgan, of Bryn Mawr College, the Society voted one hundred dollars towards an additional table at the Naples Marine Biological Station, and fifty dollars for the Naturalists' Table at Woods Holl. It was reported that President McKinley was about to appoint a politician to the office of Fish Commissioner, and the sentiment of the assembled investigators upon this matter is shown in the following resolution presented by Prof. C. L. Bristol, of New York University, and supported by Prof. H. F. Osborn. "Resolved: (*a*) That the American Society of Naturalists as representatives of the principal scientific and educational interests of this country, unanimously express to the President and Congress of the United States their sentiments that the Commissioner of Fish and Fisheries should, according to the law of 1888, governing his appointment, be a person of proved scientific and practical acquaintance with the fish and fisheries of the coast. (*b*) That it is of the utmost importance that the Fish Commission, as one of the most useful scientific institutions of the Government, should be free from political influence and should be administered with the highest degree of scientific efficiency by an experienced officer." A discussion was held on the subject of "The Biological Problems of To-day," and it was dealt with from the points of view of palæontology, botany, anatomy, psychology, physiology, developmental mechanics, and morphogenesis. In addition to the combined meetings of the societies, the following bodies held separate meetings for the communication and discussion of papers bearing upon their particular branches of science: American Physiological Society, American Morphological Society, American Psychological Association, Association of American Anatomists, Association for Botanical Morphology and Physiology, Section of Anthropology of the American Association. The Society will meet next winter at New York.

IN the *Zeitschrift für Vermessungswesen*, Prof. Hammer directs attention to a Babylonian plan depicted on a clay tablet found in the excavations at Tello, and now preserved in the Constantinople Museum. The plan was made about 3000 years before the Christian era, and represents an estate belonging to King Dungi. It is of importance not only as a contribution to the early history of surveying, but also as a confirmation of the views on Babylonian measures of length and of area propounded by Reisner at a meeting of the Berlin Academy of Sciences on April 9, 1896. A copy of the plan has been examined by Eisenlohr, the eminent authority on Egyptian archæology, and he claims to be able to read from the cuneiform inscription the names of the two surveyors engaged. On one side of the tablet there is a dimensioned sketch of the plan of the estate not drawn to scale. The estate is divided by the survey lines into rectangles, right-angled triangles, and trapeziums. In each case the area is stated, two results obtained by different methods being given. Eisenlohr has plotted the survey, and his calculations of the area agree with the results given on the tablet. On the other side of the tablet the areas of the various portions are added together, two sets of figures being used, and the arithmetical mean taken as the correct area. The unit adopted, the *gan*, is thought to be equal to 4199 square metres. The absolute measures are, however, of slight importance. More important is the fact that land surveying was carried on 4000 years B.C., apparently in an accurate manner, and certainly with check measurements.

M. E. DUBOIS (*Bulletins de la Société d'Anthropologie de Paris*, 1897, fascicule 4) infers from theoretical grounds, based partially upon observation of the proportion of the surface of the retina to that of the body, that the weight of the brain of mammalia of similar form and the same species, varies directly as the surface of the animal.

A FRESH development of Dr. Folgheraiter's investigations on the magnetic properties of Etruscan vases is described in the *Rendiconti della R. Accademia dei Lincei*, vi. 12, the object of the present experiments being to discover by what process the black vases obtained their colour. Three hypotheses had been advanced by archæologists: the first, that the vases were made of a special kind of clay; the second, that the clay was mixed with fine carbon or lamp-black; and the third, that the colouring matter was introduced into the clay after the vases had been formed, and possibly after they had been baked. Dr. Folgheraiter found, however, that carbon mixed with clay disappeared almost completely when heated to a temperature of about 380°, and that fragments of the old vases also lost their colour at that temperature; while to account for the magnetic properties of the vases they must have been heated to over 420°. Moreover, the clays experimented on did not lose their plasticity until a temperature of 420° to 500° was reached. The first two hypotheses were thus negatived. With regard to the third, it was found that the blackening could not be effected by heating in a closed chamber full of carbon; moreover, if the carbon was infiltrated into the pores of the clay by carbonisation, it did not burn away till a higher temperature was obtained than was sufficient to decolorise the vases. Thus neither of the three hypotheses was corroborated by experiment. Dr. Folgheraiter suggests as a possible explanation that the clay, after being baked, may have been soaked with bitumen, and then heated to 300°; it would thus acquire a polished black surface with the colour gradually fading towards the interior, as in these Etruscan vases.

THE "Illustrations of Maori Art," by Mr. H. Hamilton, now in course of publication by the New Zealand Institute, is the most attractive contribution to ethnography we have seen for a long time. The first part of the work, on the Canoes, was issued some months ago, and the second part, dealing with material relating to "Maori Habitations," has lately come to hand. The three succeeding parts will be devoted to weapons, dress and decoration, and social life. The present part contains twenty-three plates upon which are reproduced, by half-tone process, photographs of characteristic buildings of the New Zealanders, and ornamentations with which the framework and different parts of the habitations were embellished. The accompanying illustration, which reproduces one of the plates on a reduced scale, is a testimony to the ability of the Maoris as wood-carvers, and to the high quality of the pictorial part of Mr. Hamilton's work. The carvings here shown are ornaments for doorways, the three upper ones being in the South Auckland Museum, and the lower one in Mr. Hamilton's own collection.



Maori Carvings for Doorways.

In addition to illustrations of this kind there are twenty-nine examples, in chromo-lithography, of Maori rafter patterns; diagrams of the construction of a Maori house; a valuable introduction on the habitations of the Maoris; and descriptive notes on the illustrations. The work is commendable both in plan and execution, and when it is completed we shall refer more fully to its scope and value.

A PHOTOGRAPHIC method of measuring the height of a balloon, and at the same time comparing the results with those furnished by barometric readings, is described in *La Nature* for January, by M. L. Cailletet. The apparatus consists of a camera with one lens pointing downwards, by means of which a photograph of the country below the balloon is taken; at the same time a lens at the top of the camera projects on the upper side of the sensitised film an image of the dial of an aneroid barometer placed above the apparatus. By measuring the distance between any two points on the photographic view, and comparing with a map of the district, the altitude of the balloon can be accurately found, and the law connecting it with the barometer reading verified experimentally.

THE Pilot Chart of the North Atlantic Ocean, issued for the present month by the Hydrographer of the United States, shows that some very severe weather was experienced during December. Many of the storm centres were in high latitudes, so that vessels along the Transatlantic routes met with north-westerly squalls of hurricane force, accompanied with snow and hail. The most severe storm of the month was one situated about latitude 54° N., longitude 44° W., on December 6, and which reached the neighbourhood of the Orkney Isles on the 8th and 9th. For some days the wind blew with hurricane force north of latitude 55° N., and east of longitude 20° W. It often happens, especially in the winter season, that in the vicinity of the Azores rough weather is experienced or several days at a time; and, with the view of illustrating the behaviour of these storms, a synoptic chart of one of them is given. They differ from the storms of other regions in that the barometric depression rarely attains any great depth, and that they follow an irregular course, the centre frequently recurving in a manner suggesting an effort to get to the eastward in the face of some resisting force, probably an area of high barometric pressure in the vicinity of the British Islands. Another feature of these storms is the suppression of the trade-winds, which is an important consideration for vessels bound from the Equator to the Channel.

DR. A. FRANZ contributes a long paper to the *Deutsche geographische Blätter*, on the possibility of establishing regular communication by sea between Europe and Western Siberia. The meteorological and hydrographical conditions are examined with as much detail as the somewhat scanty observations available admit; and the general result seems to show that the difficulties in the way of regular navigation are not insuperable, although sufficiently great to make it doubtful if it is worth while, from a commercial point of view, to try to overcome them.

The first part of a new volume of the *Memorie della Societa Geografica Italiana*, recently issued, contains, besides other shorter papers, the results of an exhaustive research into the records of earthquakes in Italy during the period 1800 to 1872, by Signor M. Baratta. The author does not pretend to completeness, but his list is, as he says, a great advance on anything hitherto available. The arrangement is chronological, and under each date are given the places where the disturbance was recorded, the hour, the nature, direction, and intensity of the shock when possible, and finally the source of information.

The *Mittheilungen du k.k. Geographischen Gesellschaft* of Vienna contain a note announcing satisfactory progress in the work of organising a meteorological service in the parts of the Balkan peninsula under Austrian rule. Discussion of the observations already made throws considerable light on the obscure transitional phases of climate occurring between the Mediterranean and continental regions.

We have received the third volume—that for 1894—of the *Bibliotheca Geographica*, edited by Dr. Otto Baschin. The work has been carried out with the same completeness and accuracy as formerly. The only new feature is an extension of the number of Slavonic languages included. The experiment of giving titles of papers in Russian and Czech, with German translations appended, was tried for the first time last year, and has been so far successful that Polish and Croatian literature is now added.

The Director of the Botanic Gardens at Buitenzorg, Java, has issued in English a Hand-guide to the Gardens, in a neat square size, accompanied by a plan.

We have received from the Gebrüder Borntraeger of Berlin a daintily produced catalogue of their natural history publications, especially in botany and geology. The firm has now been in existence over a century.

In the *Transactions of the Academy of Science of St. Louis*, Prof. W. Trelease describes a remarkable instance of "phytobezoar," two balls from 3 to 4 inches in diameter, taken from the stomach of a bull, and composed entirely of the barbed hairs with which the cushions of species of *Platopuntia* are covered.

We learn from the *Botanical Gazette* that the Secretary of Agriculture for the United States has included in his estimate of the expenditure for the coming year an item of 20,000 dols., to be set aside from the seed fund, for the introduction into the States of valuable economic plants. If sanctioned by Congress, Mr. D. G. Fairchild will be put in charge of the work. His extensive travels and his reputation as a botanist peculiarly fit him for the work.

The *Botanical Gazette* states that the Biological Survey of the State of Alabama is being pushed and extended as rapidly as limited means will permit. Over 20,000 specimens have been added to the herbarium collection during the present year, including fine series of lichens, mosses, and liver-worts. Much of the success of the work is due to the activity and devotion of Prof. F. S. Earle and Mr. Carl F. Baker, of the Alabama Polytechnic Institute, and of other botanists of the Survey.

The pitcher-plants of the genus *Nepenthes* are just now engaging the attention of systematic botanists. In the *Journal* of the Royal Horticultural Society for December 1897 is an elaborate article on their growth and culture by Mr. H. J. Veitch, with numerous excellent illustrations, to which are appended some remarks by Mr. F. W. Burbidge. Mr. F. M. Bailey describes the four Australian species in the *Queensland Agricultural Journal*, vol. i. part 5, giving figures of two of them.

The first number of the new volume (vol. ix.) of the *Journal of Conchology* contains articles and notes of interest to conchologists. The size of the page has been enlarged, and an index is given of the volume just completed. Among the contents is the presidential address delivered by Prof. S. J. Hickson, F.R.S., on "Torsion in Mollusca." Mr. Lionel E. Adams records observations which distinctly show that the slug *Limax maximus* has a sense of smell.

The eighth part of Mr. Oswin A. J. Lee's attractive work, "Among British Birds in their Nesting Haunts," has just been published by Mr. David Douglas, Edinburgh. The nests illustrated upon the ten fine plates are those of the song thrush, great crested grebe, great skua, tawny owl, bearded tit, common curlew, and siskin. This part appears to conclude the second volume of Mr. Lee's work.

A good general view of physical and chemical science, designed mainly for medical students, is given in the "Physikalisch-chemische Propaedeutik" of Prof. Dr. H. Griesbach. (Leipzig: Engelmann.) The book is being published in parts, and the second part of the second half has just appeared. A knowledge of the principles of physics and chemistry is essential to the student of modern medicine, and Dr Griesbach has set himself to show how physical methods bear upon medical science. Another part of the work remains to be published, and when it appears, we shall review the book in its completed form.

The simplest member of the group of the ketoses, of which ordinary lævulose or fruit sugar is the best known representative, is dihydroxyacetone, $CH_2(OH).CO.CH_2(OH)$, which has long eluded the attempts of chemists to isolate it in the pure state, although mixtures in which it is undoubtedly present have been obtained by several investigators by the oxidation of glycerine. Oscar Piloty has now succeeded in preparing this interesting compound in the pure condition, and describes its properties in the current number of the *Berichte*. The starting point for its preparation is the oxime, $CH_2(OH).C:NOH.CH_2(OH)$, which can easily be obtained from the product of the action of formaldehyde on nitromethane, both substances of very simple constitution. When this oxime is treated with bromine, nitrous oxide is evolved and dihydroxyacetone produced. It crystallises well, and has a sweet and cooling taste. In other respects it also shows the well-known characteristics of the sugars, reducing Fehling's solution almost as powerfully as grape sugar, and yielding an osazone with phenylhydrazine. On reduction it is converted into glycerine, a new synthesis of this important compound being thus effected. The production of dihydroxyacetone from formaldehyde is of great interest in view of the important function which the latter is supposed by many to perform in the natural production of sugars in the vegetable organism.

The additions to the Zoological Society's Gardens during the past week include a Macaque Monkey (*Macacus cynomolgus*) from India, presented by Mr. R. S. Gleave; two Aard Wolves (*Proteles cristatus*, young) from South Africa, presented by Captain Baker; a Greater Sulphur-crested Cockatoo (*Cacatua galerita*) from Australia, presented by Lady Pilkington; a Black-backed Piping Crow (*Gymnorhina tibicien*) from Australia, presented by Mr. T. G. F. Winser; two Herring Gulls (*Larus argentatus*), British, presented by the Rev. F. Hopkins; a Japanese Ape (*Macacus speciosus*) from Japan, two Ganga Cockatoos (*Callocephalon galeatum*) from Australia, a Red-tailed Buzzard (*Buteo borealis*) from Jamaica, deposited.